

Sponges of the family Chondrillidae (Porifera: Demospongiae) from the Pacific coast of Mexico, with the description of three new species

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Abstract.—Two new species of *Chondrilla* from the Mexican Pacific coast are described, based mainly on the distribution of the spherasters throughout the body of the sponge and in the cortex. *Chondrilla montanusa*, n. sp. is mainly characterized by the presence of a minutely warty surface formed by the accumulation of the spherasters in the cortex which gives it a microtuberculate aspect. This feature clearly distinguishes the species from other known species of *Chondrilla*. *Chondrilla pacifica*, n. sp. is easily distinguished from the former by having a smooth surface and a thin layer of spherasters in the cortex and by a low proportion of spicules in the choanosome, which is clearly different from the related *C. verrucosa*. We also describe *Chondrosia tenochca*, n. sp., mainly characterized by having a cortex composed of two layers, a very dense choanosome, with hardly any canals, little or no foreign debris, and spherulous cells that are very irregularly formed. A key to all chondrillids from the East Pacific is also provided.

Chondrosida is a group of encrusting to massive, liver-like or gelatinous sponges (Lévi 1973) with only four valid genera: *Chondrosia* Nardo, 1847, *Chondrilla* Schmidt, 1862, *Thymosia* Topsent, 1895, and *Thymosiopsis* Vacelet & Perez, 1998. These genera had traditionally been included in two different families: Chondrillidae Gray, 1872 and Chondrosiidae Schulze, 1877. Even though Chondrosiidae has been used by many authors, the recent tendency is to include these genera in a single family Chondrillidae (Bergquist 1978, Hooper & Wiedenmayer 1994). It was difficult to assign these genera to ordinal level mainly because of the complete lack of spicules; the megascleres have been lost secondarily, and in some chondrillids, microscleres may or may not be present (such as *Chondrosia*) (Topsent 1895). Moreover, biochemical evidence showed the affinity of Chondrillidae

with the order Hadromerida (Bergquist 1978). Due to these features the order Chondrosiida was proposed to harbor the family Chondrillidae (Boury-Esnault & Lopes 1985). Later, molecular data confirmed the validity and the monophyly of the order Chondrosiida (Boury-Esnault 2002).

The systematics of the group has been based almost entirely on the size and morphology of the spicules, which in *Chondrilla* are exclusively asters, mainly spherasters. However, the size and morphology of the spherasters can vary between populations of the same species and, thus, may be an unreliable character to discriminate between species (Bavestrello et al. 1993, Klautau et al. 1999). This lack of morphological taxonomic characters in many genera such as *Chondrilla* (Klautau et al. 1999), or the avoidance of proper tech-

niques to study small microscleres in detail in genera such as *Guitarra* (Boury-Esnault et al. 1993), *Mycale* (Carballo & Hajdu 1998), etc., have led many morphologically similar but evolutionary distinct species to be lumped into artificially cosmopolitan morphospecies. A case in point is the sponge species *Chondrilla nucula*, which traditionally has been considered to have a very wide geographical distribution, but was recently separated into five distinct genetic forms in the Caribbean and the Southwestern Atlantic (Klautau et al. 1999). Currently, the sponge populations from the Mediterranean and the adjacent Atlantic (coasts of Spain, Portugal and Morocco) are the only ones considered to be *Chondrilla nucula* (Klautau et al. 1999). It has also been recently suggested that *Chondrosia reniformis* (as with *Chondrilla nucula*) may be a species complex, and that citations of this species in places such as the Indo-Pacific region are probably not correct (Lazoski et al. 2001).

Of the four genera included in the family, only *Chondrosia* and *Chondrilla* are represented in the East Pacific. In the Northeastern Pacific the only known *Chondrilla*-species is *Chondrilla nucula* [recorded by de Laubenfels 1935, by Green & Gómez (1986) from the west coast of Mexico, and by Hofknecht (1978) from the Gulf of California]. More recently *Chondrilla verrucosa* Desqueyroux-Faúndez & Van Soest, 1997 has been described in the Central Eastern Pacific (Galapagos Islands), which is actually the only record of the genus *Chondrilla* from the Southeast Pacific.

This study seeks to clarify the differences between the taxonomy of sponges of the family Chondrillidae in the Mexican Pacific. Three new species are recognized: *Chondrilla montanusa*, n. sp., *Chondrilla pacifica*, n. sp. and *Chondrosia tenochca*, n. sp.

Materials and Methods

Specimens were collected by scuba diving and snorkelling along the Mexican

coast of the Pacific Ocean and preserved in 70% alcohol. Spicule preparation followed the techniques described by Rützler (1974) for light and scanning electron microscopy (SEM) using a JEOL JSM-35 and a gold-coated 300 Å layer. Twenty or more spicules randomly chosen were measured for each of the specimens studied.

Material, paratypes and spicule slides have been deposited in the sponge collection of the Laboratorio de Ecología del Bentos del Instituto de Ciencias del Mar y Limnología (ICMyL) in Mazatlán, México (LEB-ICML-UNAM), as well as in the Colección Nacional del Phylum Porifera Gerardo Green in México, D. F. (CNPGG). The type material has been deposited in the Museo Nacional de Ciencias Naturales in Madrid (Spain) (MNCN) and in the British Museum of Natural History (BMNH) (London).

Results

Order Chondrosida Boury-Esnault & López, 1985 Family Chondrillidae Gray, 1872

Synonymy.—see Boury-Esnault 2002.

Diagnosis.—Chondrosida, encrusting to massive, with a marked cortex enriched with fibrillar collagen, with inhalant apertures localized in pore-sieves or cribriporal chones and a skeleton often absent, composed, when present, of nodular sponging fibers or aster microscleres only (never megascleres). Collagen always very abundant. Oviparous (Boury-Esnault 2002).

Chondrosia Nardo, 1847

Synonymy.—See Boury-Esnault 2002.

Type species.—*Chondrosia reniformis* Nardo, 1847 (by monotypy).

Diagnosis.—Chondrillidae without skeleton and with a well developed cortex made of thick fascicles of collagen and with numerous spherulous cells (Boury-Esnault 2002).

Chondrosia tenochca, new species

Synonymy.—*Chondrilla nucula* De Laubenfels, 1935: 12.

Material examined.—Holotype: MNCN 1.01/236, Cerritos, (Mazatlán, Sinaloa), 23°18'51"N, 106°29'31"W, 18 Feb 2000, intertidal, on rocks. Paratypes: LEB-ICML-UNAM-59, Islas Isabeles (Nayarit), 21°50'33"N, 105°53'10"W, 20 Nov 1999, intertidal, on rocks. LEB-ICML-UNAM-120, Cerritos, (Mazatlán, Sinaloa), 23°18'51"N, 106°29'31"W, 18 Feb 2000, intertidal, on rocks. LEB-ICML-UNAM-474, Antiguo Corral del Risco (Punta Mita, Nayarit), 20°46'20"N, 105°32'49", 7 Apr 2002, 4 m depth, on dead corals. CNPGG-0457, Bahía Santa Cruz (Oaxaca), 15°45'N, 96°07'W. 22 Nov 1985, 1–2 m depth.

Description.—Encrusting to semi-encrusting sponge, 2 to 10 mm thick, spreads out over rocky substrate, covering areas up to about 6.5 × 5 cm. The smallest specimens measure 1 by 1.4 cm. The sponge is firm, rubbery and variably compressible. Live specimens have conspicuous oscules, circular to oval, up to 2 mm in diameter, some with slightly elevated rims. The surface is smooth and shiny. The color is evenly dark brown or black on the top of the sponge, and dark gray on the sides. Choanosome and base are ivory-colored. The color is well preserved in spirit, but paler after several years. The choanosome is very dense, almost without canals (fleshy), with little or any foreign debris. It has a notorious undetachable cortex up to 300 µm thick, free of debris. The cortex seems composed of two layers: the most superficial with a very high density of spherulous cells, and the internal with less spherulous cells. The density of these cells in the choanosome decreases slightly from the zone near the cortex to the basal part. The spherulous cells contain 9 to 20 spherules 0.5 to 2.5 µm in diameter. They are very irregular in form; most frequently they are enlarged or oval.

Distribution.—The species has been

found in Oaxaca, Nayarit and Sinaloa (México, eastern Pacific). De Laubenfels (1935) described an encrusting (2–3 mm thick) and aspiculous sponge from the West coast of the Peninsula of California as *Chondrilla nucula*, which should be considered a *Chondrosia tenochca*. Between 0 to 4 meters depth, typical of the intertidal zone, on rock or dead coral.

Etymology.—*Tenochca* means tribe that inhabited México. The term is derived from the Nahuatl word “Tenochtitlan”, which was the largest city in America in its time.

Remarks.—De Laubenfels (1936) established *Chondrosia chucalla* from the Central Pacific as a nomen novum for *C. collectrix* Lendenfeld, 1888 from Australia, in order to correct a junior secondary homonym of *C. collectrix* Schmidt, 1870 from the Caribbean. Previously, *C. collectrix* Lendenfeld, 1888 was considered a synonym of *C. spurca* (Carter, 1887) by Topsent (1895). Later, Wiedenmayer (1989), and Hooper & Wiedenmayer (1994) considered *C. spurca* Carter, 1887 a synonym of *C. reticulata* (Carter, 1886, as *Halisarca reticulata*). Our specimens match the description of *C. chucalla* sensu de Laubenfels (1954) but do not agree with the description of *C. reticulata*, a deep purple sponge with foreign debris scattered or crowded throughout the choanosome (Wiedenmayer 1989). Desqueyroux-Faúndez & Van Soest (1997) assigned specimens from the Galapagos to *C. chucalla* with some hesitation, as well as Wiedenmayer (1989), who doubtfully considered the specific name *chucalla* from the Central Pacific (de Laubenfels 1951, 1954, 1955) as a synonym of *C. reticulata*. We think that the de Laubenfels (1954) specimens, and ours, are a new species, different from *C. reticulata*, and must be considered as *Chondrosia tenochca*.

Chondrilla Schmidt, 1862

Synonymy.—see Boury-Esnault, 2002.

Type species.—*Chondrilla nucula* Schmidt, 1862 (by subsequent designation).

Diagnosis.—Chondrillidae with a skele-

ton composed only of siliceous spicules of the aster type, mainly in the cortex and around the canals (Boury-Esnault 2002).

Chondrilla montanusa, new species

Figs. 1, 2, 4, Table 1

Synonymy.—*Chondrilla nucula* Green & Gómez, 1986:284.

Material examined.—Holotype: MNCN-1.01/176, Isla Lobos (Mazatlán, Sinaloa), 23°13'49"N, 106°27'43"W, 17 Feb 2000, intertidal, on rocks. Paratypes: BMNH-2002.9.10.1, Isla Lobos (Mazatlán, Sinaloa), 23°13'49"N, 106°27'43"W, 17 Feb 2000, intertidal, on rocks. LEB-ICML-UNAM-428, Isla Pájaros (Mazatlán, Sinaloa), 23°15'29"N, 106°28'25"W, 15 Feb 2002, 4 m depth, on rocks. LEB-ICML-UNAM-135, Cerritos (Mazatlán, Sinaloa), 23°18'51"N, 106°29'31"W, 02/02/2001, 1 m depth, on rocks. LEB-ICML-UNAM-136, Isla Lobos (Mazatlán, Sinaloa), 23°13'49"N, 106°27'43"W, 02/17/2000, intertidal, on rocks. CNPGG-0450, Hermano del Sur, (Mazatlán, Sinaloa), 23°11'N, 106°27'W, Mar 1982 on barnacle shells. LEB-ICML-UNAM-452, Cerritos (Mazatlán, Sinaloa), 23°18'51"N, 106°29'31"W, 10/30/01, intertidal on bivalve shell. CNPGG-0448, Calerita (La Paz, Baja California), 24°22'N, 110°17'W, on rock. CNPGG-0449, Hermano del Norte (Mazatlán Sinaloa), 23°11'N, 106°26'W, 03/1982. CNPGG-0458, Bahía Tangolunda (Oaxaca), 15°46'N, 96°05'30"W.

Description.—Thinly encrusting, 1–4 mm thick, covering rocky substrate up to about 2.5 by 7 cm. The surface is shiny and minutely warty, these warts are evenly scattered and conspicuous, 183–(226)–283 μm in diameter, 50–265 μm apart (Fig. 1A). The thickest specimens (up to 45 mm in thickness) have a mostly smooth surface, with a few warts in some areas and on the edges. Oscules are slightly elevated in some specimens (up to 2 mm). The consistency is cartilaginous. The color alive is black, dark brown or gray (slightly mottled); it is light gray towards the border and in the choanosome; it conserves the same color in spirit.

Structure.—Cortex not detachable, up to about 400 μm thick (250–500 μm at the top of a wart), organized by accumulated spherasters in mounds, forming a very particular layer that gives the surface a warty appearance. In the choanosome the spherasters are scarce and wide apart, they are mainly at the base of the sponge and surrounding the canals. Canal diameters are 20–370 μm. The spiculation consists of spherasters 25.5 μm in average diameter (Table 1), which may appear in very different shapes in a single specimen: rays can be conical, short and blunt or reduced, in some cases mammiform. Others have only a centrum with very small rays or a granulose surface. The extremities of the rays are often smooth, seldom slightly rough, and sometimes exhibit several small spines at the tip. The number of rays varies between 10 to 26.

Distribution.—Sinaloa (Mazatlán) (Green & Gómez 1986 as *C. nucula*), present records in Baja California Sur and Oaxaca.

Etymology.—The specific epithet is derived from Latin *montanusa*, referring to the mountain aspect of the cortex.

Remarks.—See below

Chondrilla pacifica, new species

Figs. 1, 3, 4, Table 1

Synonymy.—*Chondrilla nucula* Hojke, 1978: 55.

Material examined.—Holotype: MNCN-1.01/233, Isla San José (La Paz, Baja California Sur), 21°01'41"N, 110°42'19"W, 26 Jan 2000, 1 m depth, on mangrove roots. Paratypes: BMNH-2002.9.10.2, Isla San José (La Paz, Baja California Sur), 21°01'41"N, 110°42'19"W, 26 Jan 2000, 1 m depth, on mangrove roots. LEB-ICML-UNAM-14, Isla Pájaros (Mazatlán, Sinaloa), 23°15'29"N, 106°28'25"W. LEB-ICML-UNAM-84, Peña de La Virgen (San Blas, Nayarit), 21°31'05"N, 105°20'05"W, 22 Nov 1999, 5 m depth, on rocks. LEB-ICML-UNAM-150, Cerritos (Mazatlán, Sinaloa), 23°18'51"N, 106°29'31"W, 2 Jan 2001, 0.5 m depth, on rocks. LEB-ICML-

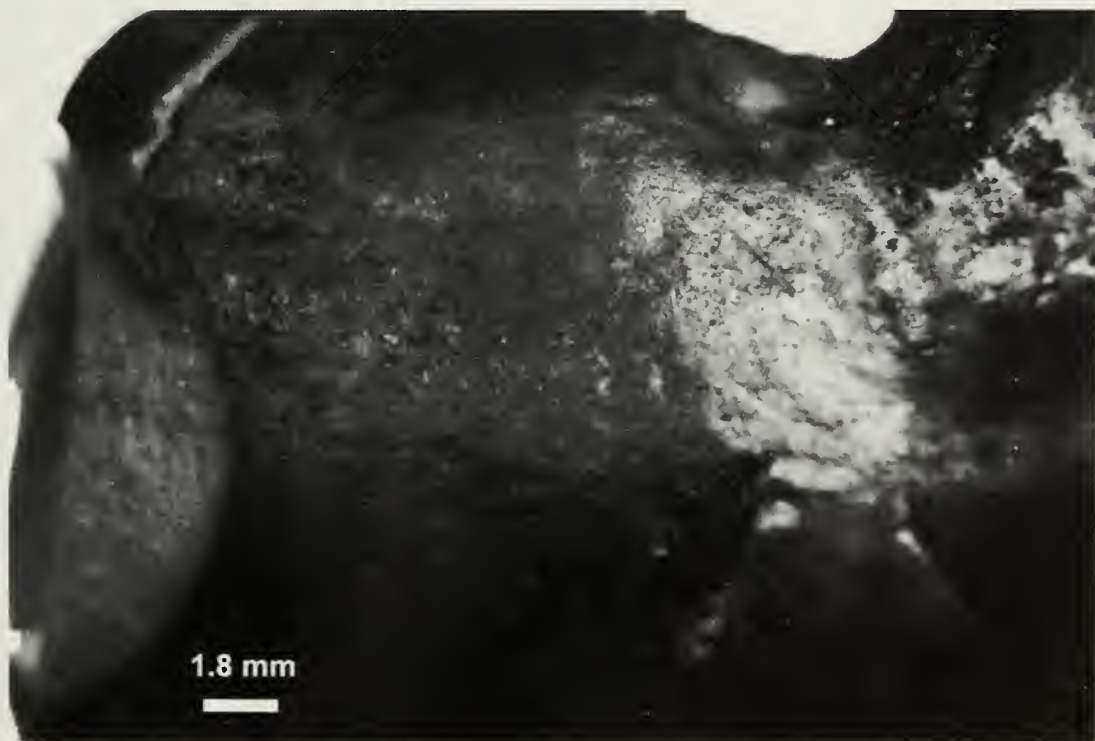
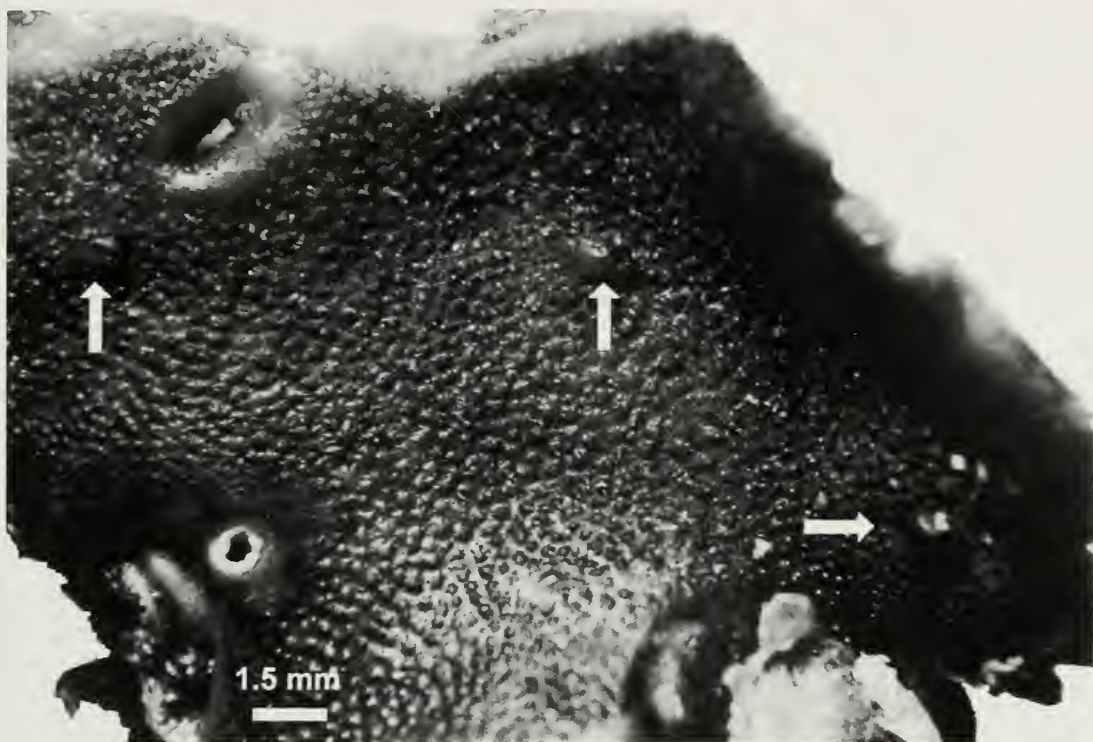


Fig. 1. A. Close up view of surface of *Chondrilla montanusa*, new species, showing the characteristic warty surface. Arrows indicate oscules. B. Close-up view of surface of *Chondrilla pacifica*, new species.

Table 1.—Characteristics of *Chondrilla montanusa* and *Chondrilla pacifica*, new species. (Numbers in brackets indicate averages).

	Asters (μm)	Shape & size (cm)	Thickness (mm)	Cortex (μm)	Color alive	Surface	Distribution
<i>Chondrilla montanusa</i>							
Holotype							
MNCN-1.01/176	7.5-(25.3)-38.5	Encrusting (5 by 2)	1-4	260-400	Evenly black	Evenly microtuberculate	Sinaloa
Paratypes							
BMNH-2002.9.10.1	7.5-(25.3)-38	Encrusting (3 by 1.5)	1-3	260-400	Evenly black	Evenly microtuberculate	Sinaloa
LEB-ICML-UNAM-135	10-(26.8)-40	Encrusting, with elevated oscules (3 by 2.4)	2-4	200-365	Evenly black	Evenly microtuberculate	Sinaloa
LEB-ICML-UNAM-428	13-(27.4)-37.5	Encrusting (3 by 1)	1-3	200-500	White pink	Microtuberculate	Sinaloa
CNPGG-0448	12-(28.7)-39	Encrusting (5 by 3) with elevated oscules	2-5	50-200	Evenly black outside, white inside	Microtuberculate/Smooth	Baja California
CNPGG-0449	15.6-(27.6)-36.4	Encrusting	1-3	100-300	Light brown	Microtuberculate/Smooth	Sinaloa
CNPGG-0450	15.6-(28.5)-39	Encrusting (3 by 4.5)	1-2	97-130	Dark brown	Evenly microtuberculate	Sinaloa
CNPGG-0458	14.5-(27.8)-37.5	Encrusting, with elevated oscules	1-3	100-240	Evenly black	Microtuberculate/Smooth	Oaxaca
<i>Chondrilla pacifica</i>							
Holotype							
MNCN-1.01/233	8.8-(26.3)-37.5	Lobed (5.5 by 4.2)	5-15	130-350	Dark gray to light brown, mottled	Smooth	Baja California Sur
Paratypes							
BMNH-2002.9.10.2	8.8-(26.3)-37.5	Lobed (7 by 2)	8-14	130-350	Dark gray to light brown, mottled	Smooth	Baja California Sur
LEB-ICML-UNAM-14	17.5-(29.8)-38	Encrusting (10 by 8)	2-6	199-332	Black mottled	Smooth	Sinaloa
LEB-ICML-UNAM-84	15-(26.8)-40	Encrusting (3 by 1.5)	2.5-7	150-250	Light brown, mottled	Smooth	Sonora
LEB-ICML-UNAM-150	7.5-(23)-40	Lobed (5.1 by 3.6)	1-18	130-250	Dark brown	Smooth	Sonora

Table 1.—Continued.

	Asters (μm)	Shape & size (cm)	Thickness (mm)	Cortex (μm)	Color alive	Surface	Distribution
LEB-ICML-UNAM-264	15–(27.4)–32.5	Encrusting (3 by 1.6)	2	60–200	White (in cave)	Smooth	Sonora
LEB-ICML-UNAM-265	16.3–(23.8)–31.3	Encrusting	12–45	90–130	Dark brown	Smooth	Sinaloa
LEB-ICML-UNAM-287	15–(24.8)–35	Encrusting (9 by 6.5)	2–11	70–180	Dark gray to light brown, mottled	Smooth	Sonora
LEB-ICML-UNAM-301	8–(23.8)–35	Encrusting (18.2 by 11.5)	4–9	100–180	Dark brown to light brown	Smooth	Baja California Sur
LEB-ICML-UNAM-368	17.5–(30.5)–45	Encrusting (7.5 by 7.5)	2–10	250–650	Dark brown	Smooth	Sinaloa
CNPGG-0451	11.5–(26.6)–34	Encrusting lobed (11.2 by 4.5)	2–20	70–500	Dark gray to light brown, mottled	Smooth	Baja California Sur
CNPGG-0453	10.5–(21.7)–26	Encrusting lobed (5 by 6.5)	10–30	120–500	Pale pink (in spirit)	Smooth	Guerrero

UNAM-264, Paraje Viejo (Guaymas, Sonora), 27°52'20"N, 110°52'08"W, 4 Nov 2000, 12 m depth, on rocks in cave. LEB-ICML-UNAM-265, Paraje Viejo (Guaymas, Sonora), 27°52'20"N, 110°52'08"W, 11/04/2000, 12 m depth, on rocks. LEB-ICML-UNAM-287, Ensenada de Bacocho-bampo (Guaymas, Sonora), 27°54'37"N, 110°57'12"W, 6 Nov 2000, 6 m depth, on bivalve shell. LEB-ICML-UNAM-301, Punta Cazón (Kino, Sonora), 28°52'20"N, 112°02'01"W, 8 Nov 2000, 3 m depth, on rocks. LEB-ICML-UNAM-308, Isla San José (La Paz, Baja California Sur), 21°01'41"N, 110°42'19"W, 21 Mar 2001, 1 m depth, on mangrove roots. LEB-ICML-UNAM-368, 23°12'29"N, 106°25'40", Punta Chile (Mazatlán, Sinaloa), intertidal, on dead bivalve shells. LEB-ICML-UNAM-550, Sayulita (Nayarit), 20°52'29"N, 105°26'43", 5 m depth, on rocks. CNPGG-0447, Punta Gorda (Ensenada, Baja California), 31°47'N, 116°45'W, 6 Mar 1977. CNPGG-0451, Bahía Concepción (Baja California), 26°30'N, 111°45'W, 30 Oct 1998. CNPGG-0453, (Guerrero), 17°54'24"N, 101°53'42"W, 11 Feb 1982, 10 m depth.

Description.—Encrusting or thickly encrusting over rocky substrate from 1 to 30 mm thick, covering areas up to 6.1 by 3.6 cm. Some specimens have meandering lobes and rounded borders. In mangrove habitats it covers submerged mangrove roots like fleshy cushion-shaped or lobate clumps up to about 2 cm thick (extent of spread approximately 11.5 by 6.5 cm). The color alive is black, dark-brown to light brown or beige, often mottled on the upper surface, and light beige to buff at the base and choanosome. In spirit, whitish or the same color as when alive. Specimens growing in dark areas or under rocks may be pale. The consistency is cartilaginous, firm, slightly compressible, and tough. The surface is smooth and shiny (Fig. 1B). Oscules wide or evenly scattered all over the surface, mostly minute (<1 mm), and slightly elevated in some specimens.

Structure.—Cortex pigmented, not de-

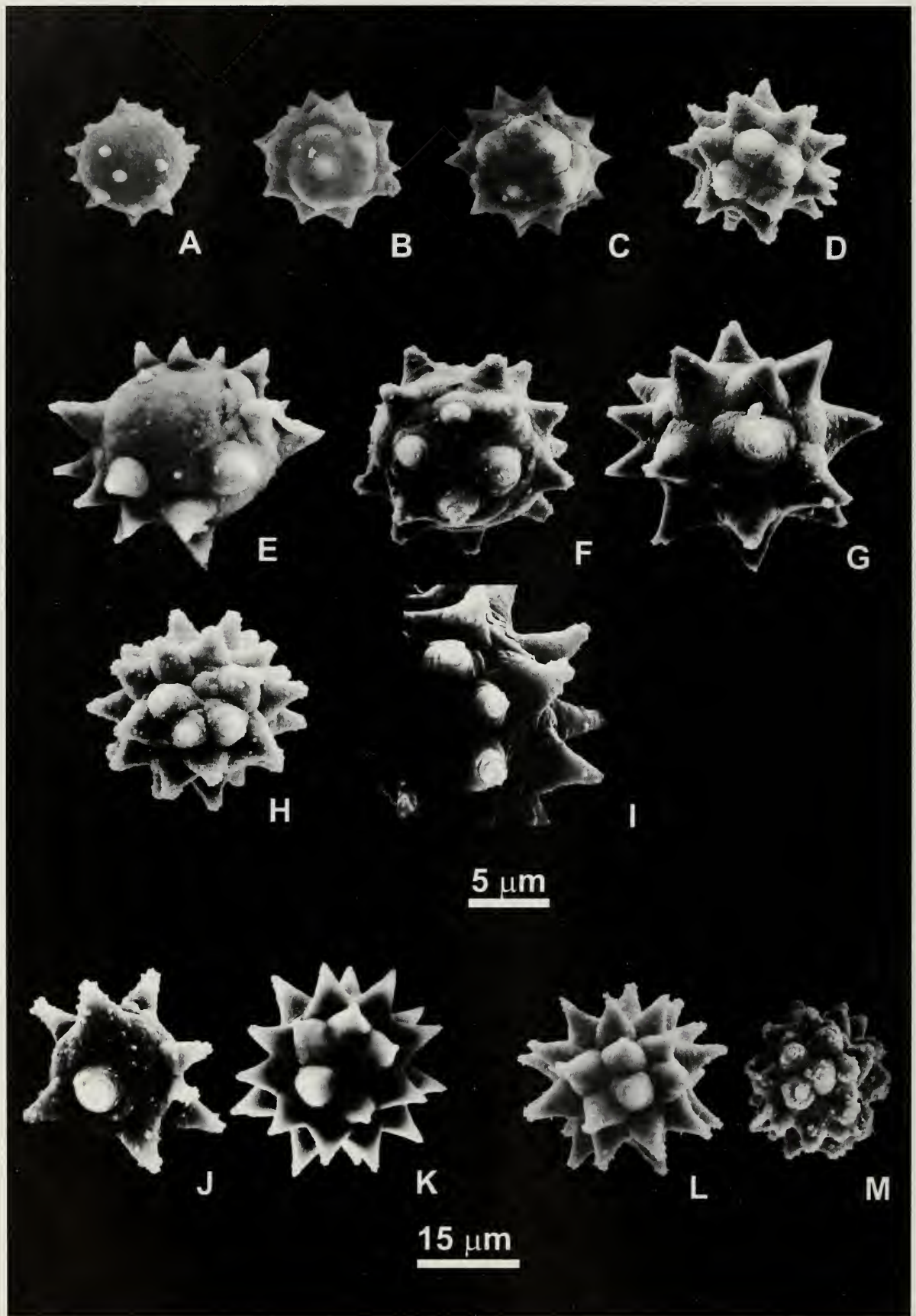


Fig. 2. SEM. Spherasters of *Chondrilla montanusa*, new species. A–D. Holotype MNCN-1.01/176. E–I. Paratype LEB-ICML-UNAM-135. J–K. Paratype CNPGG-0449. L–M. Paratype CNPGG-0458. Scale bars = 15 μm (except detail I = 5 μm).

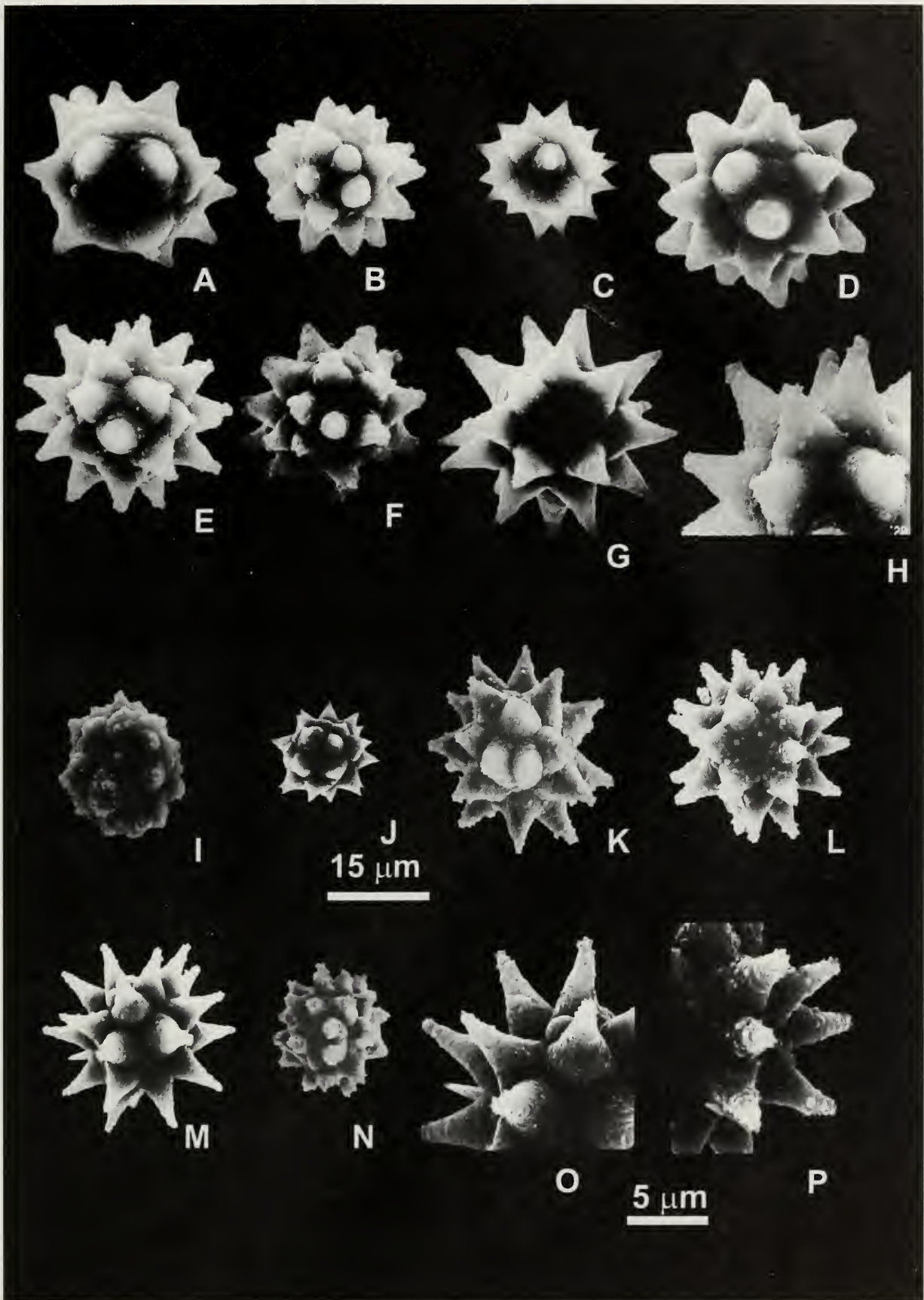


Fig. 3. SEM. Spherasters of *Chondrilla pacifica*, new species. A-H. Holotype MNCN-1.01/233. I-P. Paratype CNPGG-0451. Scale bars = 15 μm (except details H, O, P = 5 μm).

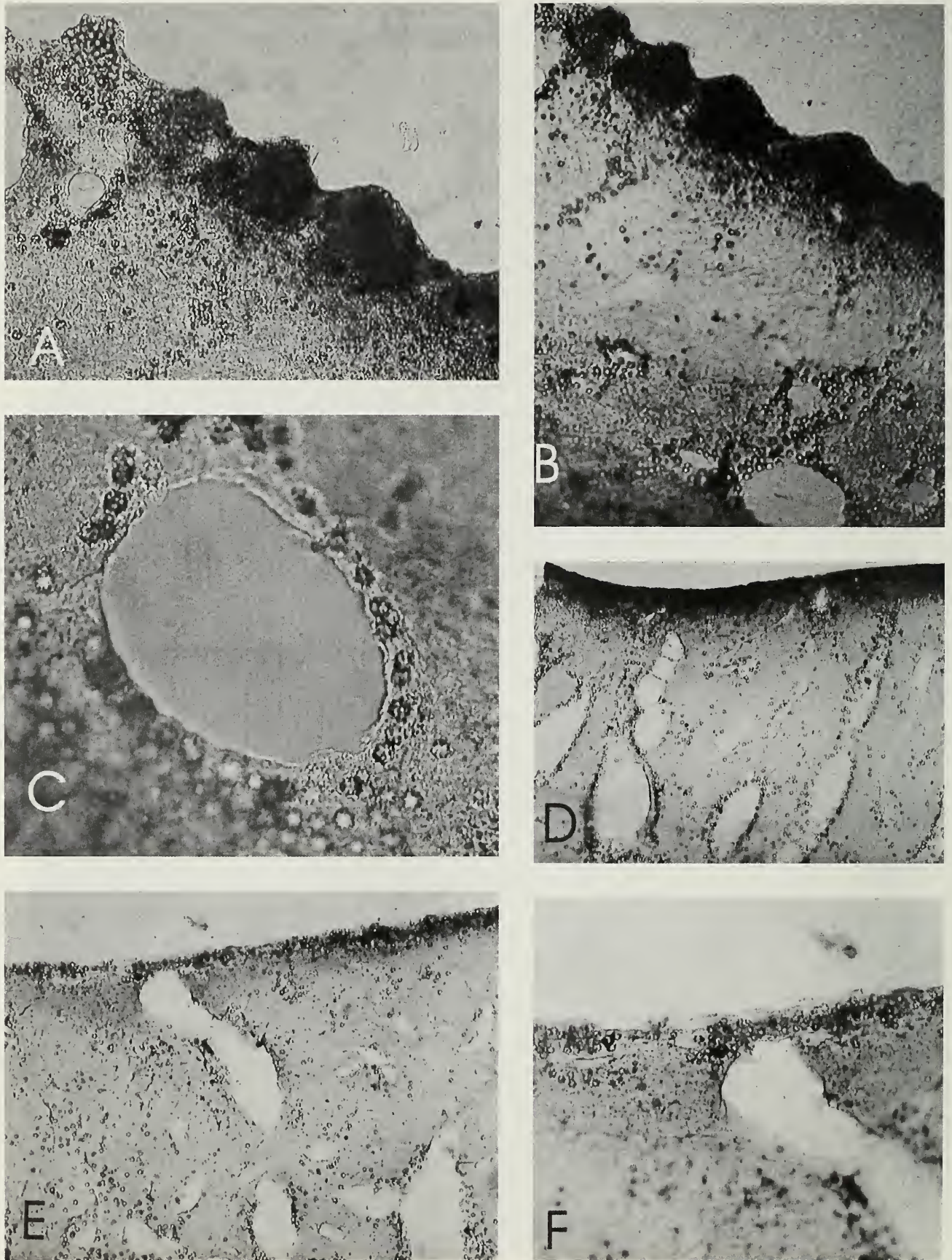


Fig. 4. Cross section of choanosome. A-B. *Chondrilla montanusa* holotype MNCN-1.01/176, detail of the elevations in the surface of the sponge due to high proportion of spherasters. C. Ample aquiferous space with spherasters organized in unispicular layer. D-E. *Chondrilla pacifica* holotype MNCN-1.01/233, surface and choanosome showing distribution of spherasters around canals and aquiferous spaces. F. Detail of the surface.

tachable, up to 650 μm in thickness, but slightly differentiated in most encrusting specimens (Table 1). The ostia (25–65 μm wide) are regularly distributed over most of the surface. The choanosome is dense, fleshy, with canals from 20 to 370 μm in diameter. The spiculation consists entirely of spherasters, 25.5 μm in average diameter (Table 1). The rays are conical, smooth, or slightly rough, but the extremities of the rays are often rough or slightly spiny. In the same specimens spherasters may appear with small irregular and mammiform rays. The number of rays varies between 20 and 30. The spherasters form a thin layer in the ectosome. In the choanosome they are not so abundant; they are scattered in the mesohyl, mainly surrounding the canals where they are organized in an uni/bispicular layer. In the basal part of the sponge they form a very dense layer.

Distribution.—Northeastern Pacific coast of Mexico. Nayarit (San Blas), Sinaloa (Mazatlán), Sonora (Guaymas, Kino), Baja California Sur (La Paz). Previously cited from Sonora (Puerto Peñasco) by Hofknecht (1978). On rocks, on bivalve shells, on mangrove roots, small caves, between 0 and 12 meters depth.

Etymology.—The specific epithet refers to the Pacific Ocean.

Remarks.—The two *Chondrilla* species that coexist in the Mexican Pacific are clearly separated by the type of surface and the organization of the choanosome. The surface in *Chondrilla montanusa* is microtuberculate and smooth in *C. pacifica*. *Chondrilla montanusa* is characterized by a minutely warty surface, visible to the naked eye, due to the high proportion of spherasters in the cortex. The proportion of spherasters in the choanosome in *C. montanusa* is higher than in *C. pacifica*.

Chondrilla pacifica is characterized by the presence of spherasters with reduced rays, a low proportion of spicules in the choanosome mainly surrounding the canals, and the presence of a smooth surface. A closely related species to *C. pacifica* is *C.*

verrucosa, the only valid record of a *Chondrilla* species in the Central Eastern Pacific. *Chondrilla verrucosa* is characterized mainly by the warty surface of the spherasters (Desqueyroux-Faúndez & Van Soest 1997) which can also appear in some spherasters of *C. pacifica*. However, the low proportion of spicules in the choanosome of the two new species distinguish them from *C. verrucosa*, which has a clearly higher proportion of spherasters in the choanosome (Desqueyroux-Faúndez & Van Soest 1997).

The morphology and the size of the spherasters have been reported to vary between populations of the same species and may not be a good character to discriminate between the species of *Chondrilla* (Bavestrello et al. 1993, Klautau et al. 1999). However, the distribution and abundance of the spherasters in the cortex and in the choanosome appear to be better diagnostic characters (Klautau et al. 1999).

Key to the Chondrillidae from the East Pacific Coast

- 1. With spherasters 2
- 1'. Without spherasters *Chodrosia tenochca*
- 2. Surface completely or partly microtuberculate *Chondrilla montanusa*
- 2'. Surface always smooth 3
- 3. Spherasters are mainly smooth and scarce in the choanosome
. *Chondrilla pacifica*
- 3'. Spherasters are mainly warty and abundant in the choanosome
. *Chondrilla verrucosa*

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